

Fig. la

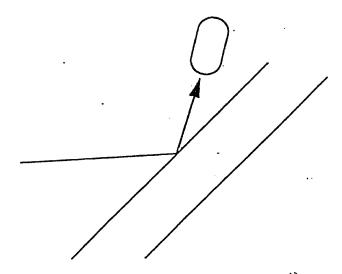


Fig. 1b

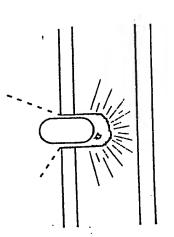


Fig. 10

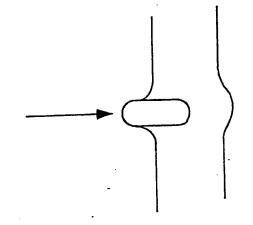


Fig. 1d

Test		Target			Areal	FS ^b :	FS ^b : Before Impact	pact	FS:	FS: After Penetration	netration		Specific
ò	No. Material(s)	Mesh	Thickness	No. of	Density	Mass	No. of Density Mass Velocity K.E. Velocity	K.E.	Velocity	K.E.	K.E. Lost		Energy Absorbed ^c
		(Yarns/in.)	per Ply (in.) Piles	Plies	(g/cm²)	(6)	(m/s).	(5)	(m/s)	(2)	3	(%)	(J/g/cm²)
20	Zylon	30X30	900.0≈	-	.0.0130	25	79	78	61.5	47.5 30.5	.30.5	39	2346
26	Zylon	30X30	∞900'0≃	-	0.0130	25	82.5	85	63	49.5	34.5	41	2654
23	Zylon	30X30	900'0≃	-	0.0130	52	80	80	35.5	20	09	75	1366
	UHMW Polye	JHMW Polyethylene Felt	≈0.13	-	+0.0309								
22	Zylon	30X30	=0.006	-	0.0130	25	82	84	Did not Penetrate ⁹	enetrate ^g	. 84	100	≥1123
	UHMW Polyethylene Felt	sthylene Felt	≈0.13	2	+0.0618								·

b FS means fragment simulator.

c Specific energy absorbed (SEA) is defined as energy absorbed per unit areal density.

f The impactor did not penetrate the felt; however, the impactor, surrounded by the felt layer, completely penetrated the fabric.

9 Only partial penetration was obtained in this test-the impactor, surrounded by the felt, remained lodged in the hole in the fabric.

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-		. Target	•			FS ^b :	FS ^b : Before Impact	act	TS.	FS: After Penetration	etration		Specific
	Material(s)	Mesh	Thickness	No. of	Areal Destiny	Mass	Velocity	ж. пі	Velocity	ж пі	Ж Ё	Lost	Energy Absorbed ^c
S. 8.			per Ply (in.)	Plies	(g/cm²)	(b)	(m/s)	3	(s/m)	3	(7)	(%)	(J/g/cm²)
	Zylon	45 X 45	=0.011	-	0.0219	25	78	92	29	10.5	65.5	98	2990
- 19d	Zylon	45 X 45	=0.011	2	0.0438	25	113	160	64	51.5	108.5	89	2477
+-	Zylon	30 × 30	≥0.006	-	0.0130	25	79	78	61.5	47.5	30.5	ස	2346
+	Zylon	30 X 30	900'0≃	-	0.0130	25	82.5	85	63	49.5	34.5	41	2654
+-	nolyZ.	35 X 35	≈0,0075	-	0.0158	25	.77.5	75	59	43.5	37.5	42	2373
+	Zylon	40 X 40	~0.009	-	0.0185	25	62	78	49.5	30.5	48.5	61	2622
\top	Zylon	40 X 40	€00.0≈	4	0.0740	96	79	300	27.5	36.5	263.5	88	3560
	Zylon	40 × 40	€00.0≈	9	0.111	96	79	300	Did not Penetrate ^e	enetrate ^e	300	100	2702
83	Zylon	30 X 30	≈0.006	-	0.0130	25	80	80	35.5	50 _e	09	75	
	UHMW Poly	JHMW Polyethylene Felt	≈0.13	-	+0.0309								
22	Zylon	30 X 30	≈0.006	-	0.0130	25	82	84		Did not Penetrate ^g	84	100	
	UHMW Poly	UHMW Polyethylene Felt	≈0.13	8	+0.0618				_				

a Tests 13 and 19 were performed and reported during the previous reporting year.

b Fragment simulator.

c Specific energy absorbed (SEA) is defined as energy absorbed per unit areal density.

d Data from this test are questionable due to the excessive pitch, debris from the aluminum honeycomb momentum trap traveling ahead of the impactor, and some PBO fibers from the back (22° orientation) layer breaking at the corner of the clamping rod, and thus likely reducing the absorbed kinetic energy.

e The impactor penetrated only the first of the six layers.

⁹ Only partial penetration was obtained in this test—the impactor, surrounded by the felt, remained lodged in the hole in the fabric. f The impactor did not penetrate the felt; however, the impactor, surrounded by the felt layer, completely penetrated the fabric.

Test VI- Test	늘	Test		Target		Areal	Areal Gripped Ed	Edges	Penetrator		Stroke	Data	Stroke Data 1st Yarn Break Fallure	Break	Fallure	Max	Maximum	Yarns	×	Work Per Broken	roken	SEA
Š.	<u> </u>	Jate Mal	iterial F	No. de- Date Material Fabric Type No. Density	<u>-</u>	Density	- - -	Width		Orienta-	Rated	Rate	Stroke	Load	Stroke	Load	Load Modulus	Broken	<u>. </u>	Done'	Yam	
		(1008)	ح	(in.) Piles (a/cm²) No. Yarns: (in.)	Selle	(a/cm²)	No. Yams:	(ji	Type	tion	tion ^e (in./s)	(sm)	(ju.)	<u>@</u>	(ju.)	(B)	(lb/in.)	(Warp+fill)	(lulb)	5	3	(J/g/cm²)
0.23		٠.	Zvlon 3.	35X35 Weave 1 0.0158 4 W&F	-	0.0158	4 W&F	50	29-q FB	45°	0.075	2	0.488	153	0.757	153	742	33+38= 71	45	22	000	300
	- -		y uoly	Zvlon 35X35 Weave 1 0.0158 4 W&F	-	0.0158	4 W&F		<u>!</u>	45°	45° 0.075	2	0.697	493	1.035	634	2545	35+36= 71	220	52	0.35	782
- 	-	7	Zylon	Felt #2	2	0.0160	0.0160 Not gripped		Total Areal Density = 0.0318	ensity	= 0.0318								بـ	- -	_	\perp
P-26 1 4/28	-	<u></u>	ylon	Zylon 35X35 Weave	-	0.0158	0.0158 4 W&F	5.0	29-g FB 45° 0.075	45°	0.075	2	0.672	\$	1.023	484	1778	32+37= 69	8 	ස 	0.34	-987
-	-		Zylon	Felt #2	-	0.0080	0.0080 Not gripped		Total Areal Density = 0.0238	Jensity	= 0.0238								_	+	-	⊥
P-28	-	4/29 Z	vlon 3	4/29 Zvlon 35X35 Weave	-	0.0158	2 F	5.0	29-g FB	45°	0.075	10	0.687	260	1.330	277	954	26+42= 68	7	8	- i	
P-29	-	4/30	You 3	P-29 1 4/30 Zylon 35X35 Weave	i	1 0.0158 2	2 F	5.0	29-g FB	_	45° 0.075	10	0.781	398	≈2.70	206	1585	2+33= 35	9 687	78	2.22	2441
	-	Ž	Zvlon	Felt #2	~	0.0160	0.0160 Not gripped		Total Areal Density = 0.0318	Density	= 0.0318								4	$\frac{1}{1}$		
p-30	=	2 49	vlon 3	5X35 Weave		1 0.0158	2 F	5.0	Rounded FB 45° 0.075	3 45°	0.075	10	0.612	214	1.232	214	829	29+41= 70	2	. :	_	·
P-31	1-	2 25	vlon 3	4 57 Zylon 35X35 Weave	1	0.0158 2	2 F	5.0		3 45°	0.075	9	0.834	463	=2.70	478	1301	2+31= 33	3 661	1 75	2.26	2348
- ; 	-	7	Zylon	Felt #2	7	0.0160	0.0160 Not gripped		Total Areal Density = 0.0318	Density	= 0.0318							- 1		+	-	
P.35		5/13 Z	Zylon	35X35 Weave	-	0.0158	2 F	5.0	29-g FB	ဝ	0° 0.075	유	0.667	288	1.051	8	1127	1+53= 54		+	0.22	\perp
P-36		₩	Zylon 3	35X35 Weave	-	0.0158 2	2 F	5.0	29-g FB		0° 0.075	유 —	0.764	388	=3.4	287	1773		943	3 107		3320
		7	Zylon	Felt #2	2	0.0160	0.0160 Not gripped		Total Areal Density = 0.0318	Densit	V = 0.0318	6							-	+	+	
P-37	2	5/20 2	Zylon	Zylon 35X35 Weave		1 0.0158	1 2 E	5,0	25-g FS-sh	° P	0.075	9	0.572	240	0.767	569	974		D	ה פ	<u> </u>	8/0
P-38	<u> </u>	5/20 2	Zylon	35X35 Weave	ı	1 0.0158 2	2	5.0		P 0	0.075			3777	>2.2	532	1475					<u>-</u>
		.7	Zylon	Felt #2	2	0,0160	0.0160 Not gripped	_	Total Areal Density = 0.0318	Densit	γ = 0.031	l							\downarrow	$\frac{1}{2}$	$\frac{1}{2}$	
					i				•													

" W = warp yams; F = fill yams.

b FS = fragment simulator, FB = fan blade

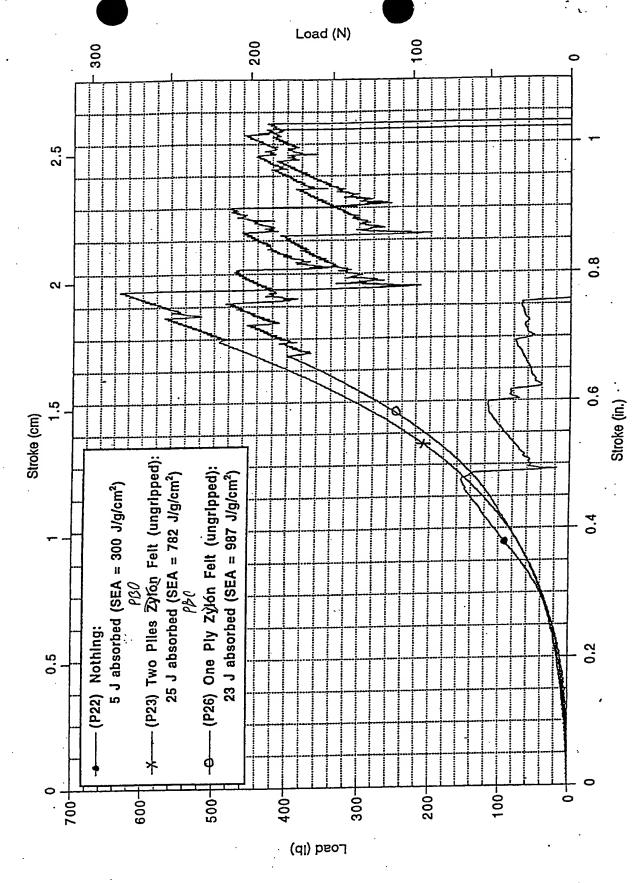
• The angle between the direction of the warp yams and the longest dimension of the penetrator's impact end (e.g. the blade direction).

d Tests involve constant stroke rate to complete penetration, except where marked "c" (cyclical loading) or "i" (interrupted before full penetration).

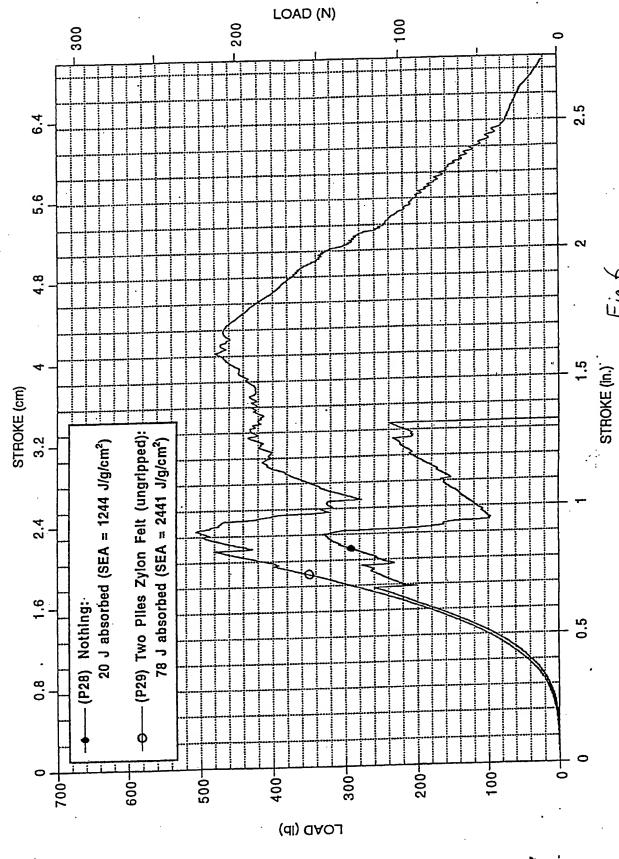
• Data is for complete penetration, except for interrupted tests (marked 'i'), where data is at maximum before interruption.

I Equals the area under the load-deflection curve.

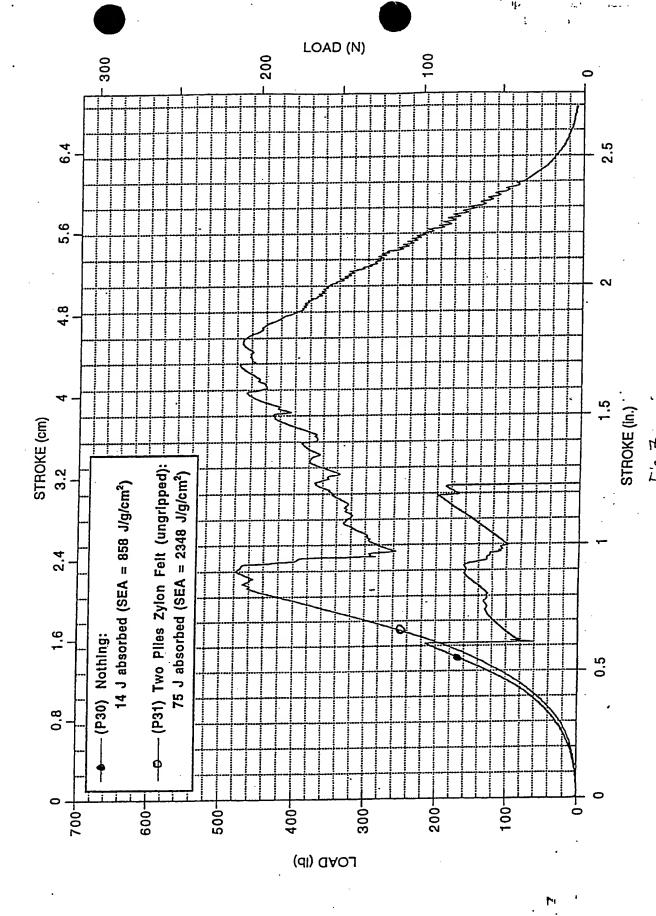
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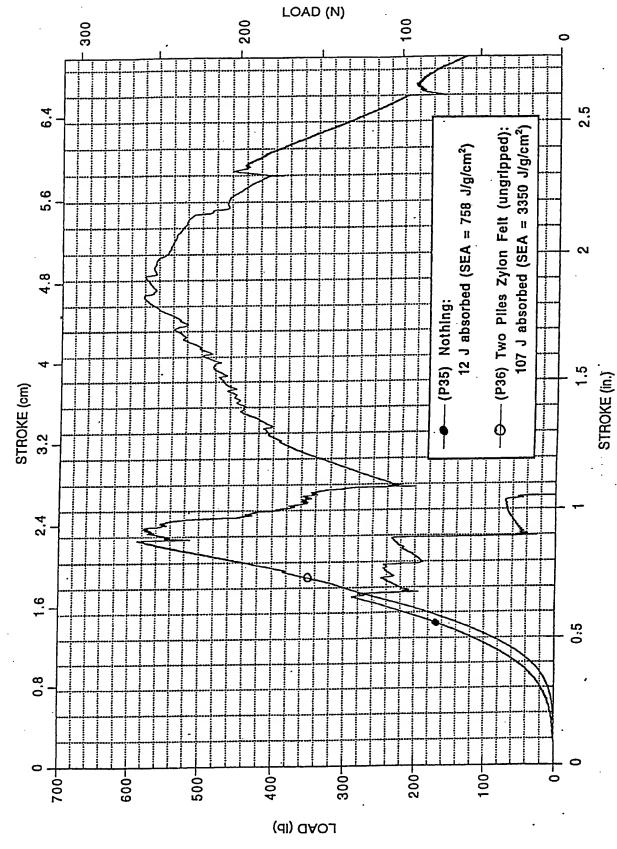


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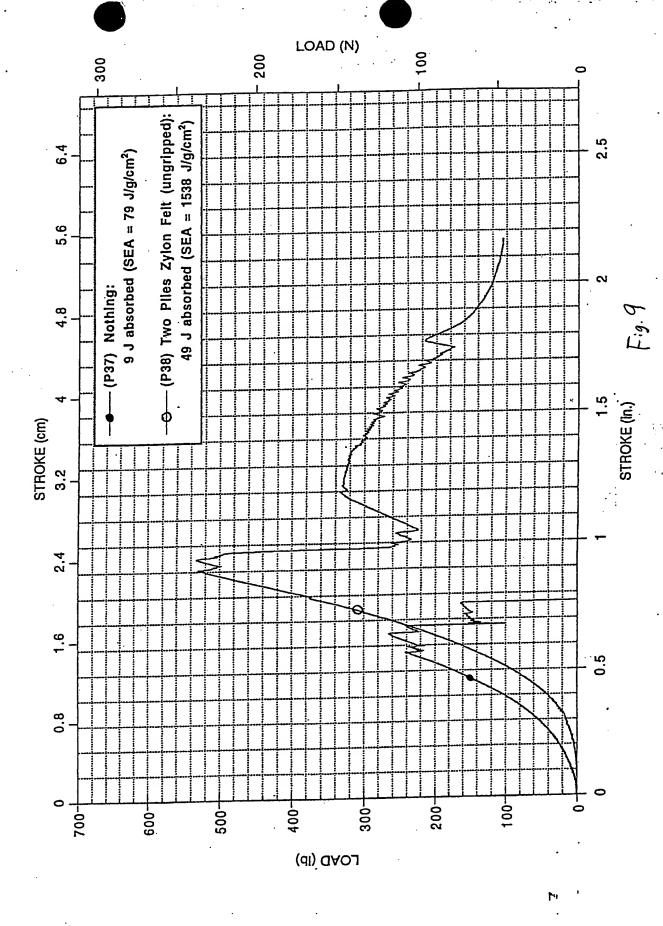
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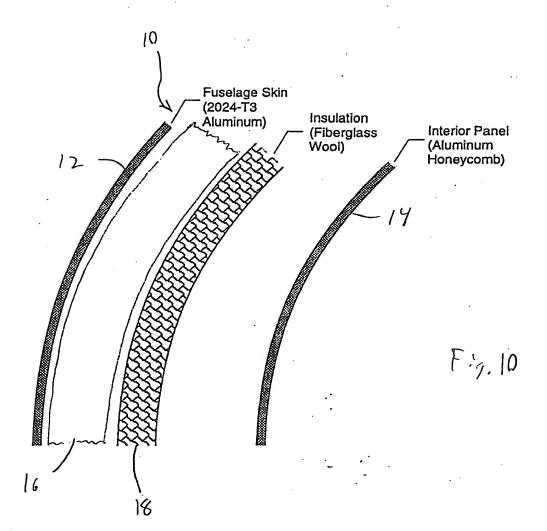


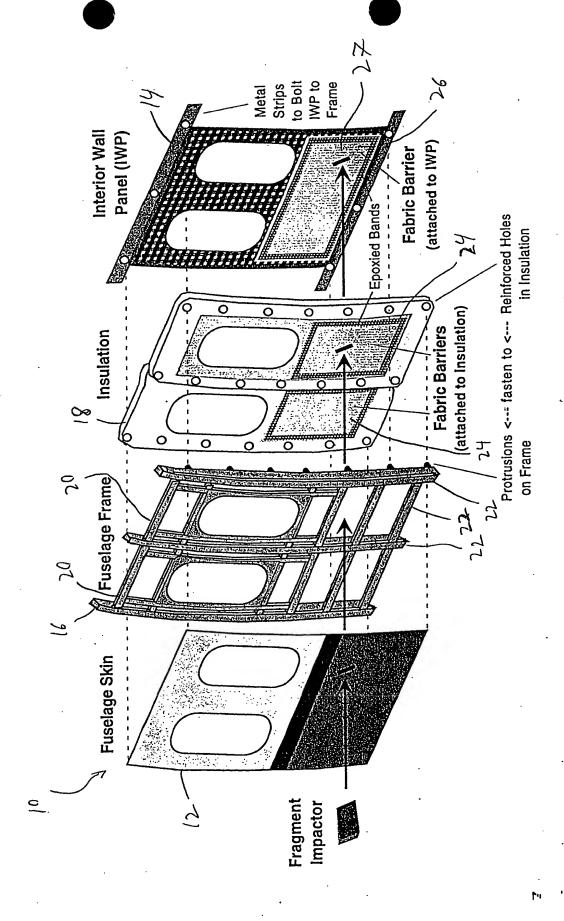


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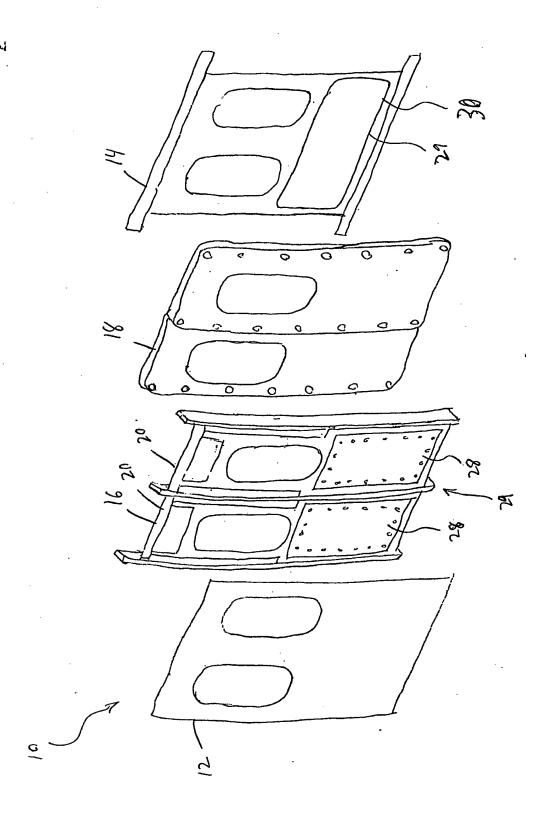
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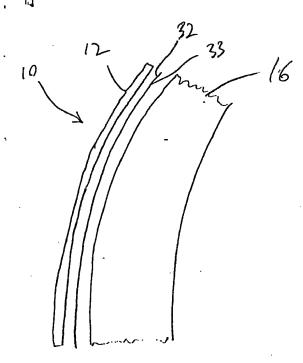
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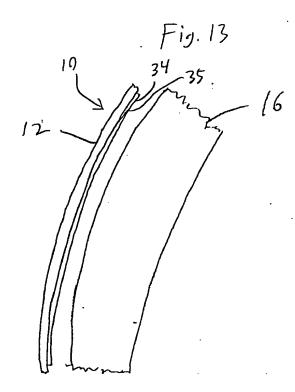
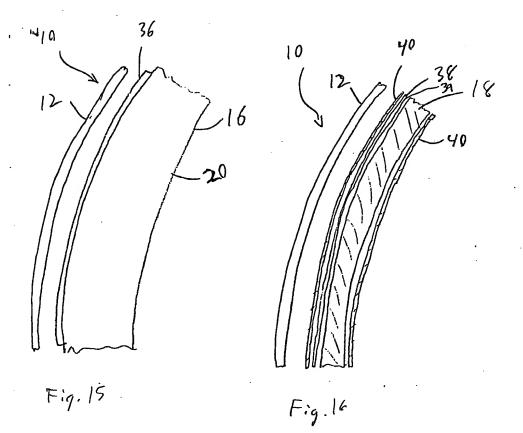
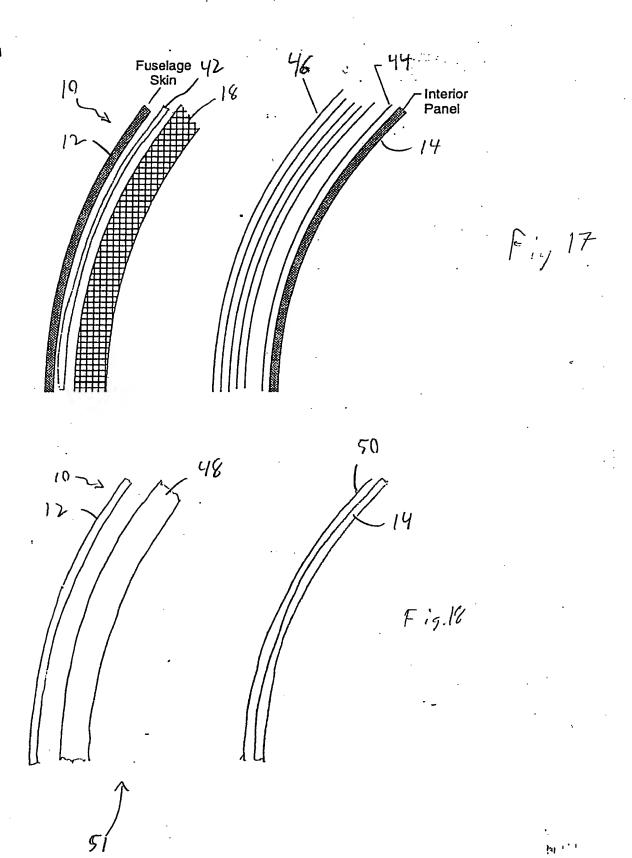


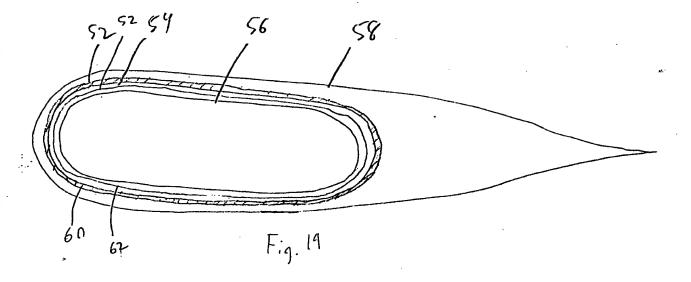
Fig.14

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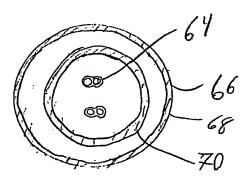


Fig. 20

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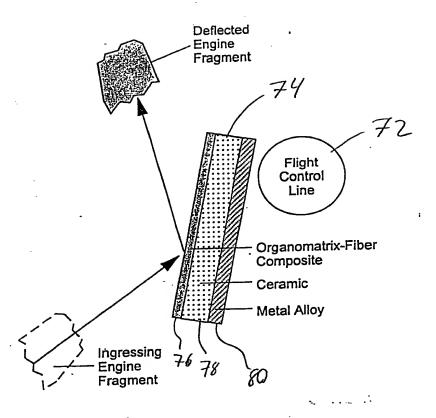


Fig. 21

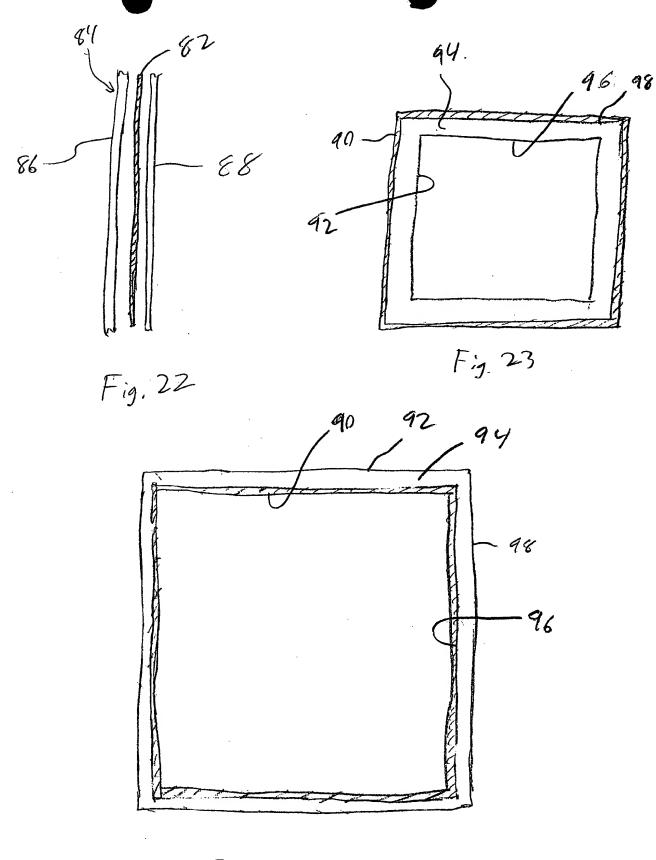


Fig 24

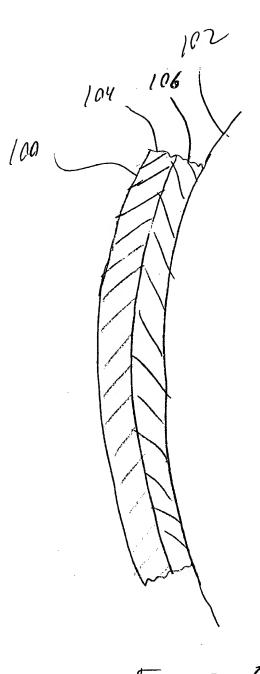


Fig. 25